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COLEOPTERA FROM KANSAS—WILLIAMS AND HUNGERFORD.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

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Notes on Coleoptera from Western Kansas.

By F. X. WILLIAMS, Bussey Institution, Harvard University, and H. B. HUNGERFORD, Kansas University.

(Plates I and II.)

FAM. MELOIDAE.

Hornia gigantea Wellman, Ent. News—Vol. XXII, page 15, 1911.

The above named and recently described species of Meloid beetle* was taken in the egg, triungulin, pupal and adult stages from the cells of the cliff-bee, *Anthophora occidentalis*, the habits of which are discussed in a previous paper (Ent. News, XXIII, June 1912). This beetle was first taken from a colony of bees in Gove County. The colony was located in the sides and roof of a water-made cave. It had once been a large one, but this parasite had nearly depleted it.

*Contrary to Dr. Wellman's statement, this beetle has the claws armed with a distinct basal spine (Fig. 10, Pl. II). Whether this character would throw it out of the genus *Hornia*, is not a matter for us to decide.

At the date they were taken (June 20, 1910,) the beetles were just coming to maturity. Some were in the pupa stage but most were adults, still in the *Anthophora* cells.

On the scopa of some of these bees taken in Gove County, were found triungulins, possibly of this species, eight being taken on the leg of one bee. (See Pl. I, Fig. 7). They were found associated with this bee also in Greeley, Sheridan, Rush and Logan Counties.

In Rush County, June 25, 1912, Mr. Isely, one of the Entomological Survey party, in digging out *Anthophora* nests, discovered a number of eggs, recently hatched triungulins and an adult female, in the cells of one colony. (See Pl. I, Figs. 1 and 2).

Some of these triungulins succeed in attaching themselves to bees and are thus often transported to new cells, where the life history may be completed by feeding upon the stores of this bee. The life-history is, no doubt, much the same as that of the related *Sitaris humeralis* of Europe, which has been studied by Fabre.

CICINDELIDAE.

Amblychila cylindriformis Say.

According to the summer's observations of 1910, *A. cylindriformis* adults were rare in western Kansas. They were found in three counties: Gove, Wallace and Greeley. In the succeeding summer's survey to southwestern Kansas, they occurred in Grant, Morton, Meade and Stanton Counties.

On June 17, one adult was taken at 5 P. M. under a strip of canvas that lay on the ground by a tree. The beetle attempted to escape into a hole beneath the roots of the tree. No more adults were seen (though search was often made for them), until Wallace County was reached. Here, after a day of fruitless search in holes of all kinds in the clay banks of the Smoky Hill river, where *Amblychila* larvae were said to be found, a small clay break near the top of a hill 300 yards from the river yielded the object of the hunt. This locality was visited at 5 P. M. and two *Amblychila* found crawling about over the ground. One was taken near a hole one-half inch in diameter, and the other near an old badger hole. Both tried to escape

and moved quite rapidly. The sky was darkened by threatening weather, and this may account for their early appearance. At subsequent times they were taken between the hours of 6.30 and 7.30 P. M., save one which was dug from a badger hole in the day time by one of the party.

Other adults taken and not mentioned above were found along a cliff-like bank of the White Woman Creek, in Greeley County.

While the adults were taken along the clay banks and breaks, the elytra were commonly found on the plains some distance from any banks.

The adult begins to search for food at sunset. One was taken Aug. 17, 1910, and lived in captivity until Aug., 1911. Careful notes were made on this insect's habits. It was kept in an iron bucket in the Entomological Department Rooms. It was first placed in an earthen crock, in which had been poured a few inches of sand, but it was three weeks before it excavated a burrow. This was on Oct. 1st. It closed its burrow to come out a week later, probably owing to the dry condition of the soil. The latter being watered, the beetle drank eagerly, its open jaws being pressed against the earth. It then buried itself again. If the ground was allowed to remain dry for any length of time, *Amblychila* would eventually be found at the surface. On such occasions it drank and ate normally and even eagerly, but at times went without taking food for a long while.

Upon being placed outside the window on a cold day in winter, the beetle became torpid but soon became active when brought into the warm room.

Concerning its feeding habits; it seems apparent that owing to its poor sight and lack of agility, it sometimes endures prolonged fasts. It seems to rely more for guidance upon its antennae than upon its eyes. When fed from a pair of forceps it would usually take the insect in a gingerly, hesitating manner, at other times made a frantic effort to locate and secure an insect which had escaped its powerful jaws. Several wasps of the genera *Polistes* and *Pelopoeus* were offered it. It did not appreciate such morsels, however, and usually avoided them. When hard pressed by an undesirable insect (held with a pair

of forceps) it would turn on its back and fight furiously. A pentatomid bug which it once seized in its jaws caused the beetle considerable inconvenience, inasmuch as for a long time thereafter it attempted to rid itself of the evil odor of the bug, and remained with its mandibles deeply inserted in the soil.

A stone being placed on its domain it made a hole beneath it and came to sally forth with some confidence when aroused.

LOCATION OF LARVAL BURROWS OF A. CYLINDRIFORMIS Say.

The larvae of this species greatly resemble in structure and general habits other larval forms of the family Cicindelidae. Their burrows were found widely distributed in western Kansas, and were rather numerous in Wallace, Wichita and Morton Counties.

They usually occurred in colonies of from two to eleven, the individual burrows being close together, often not more than one and one-half inches apart. Usually a colony can be circumscribed by a ten inch radius.

We found in general two sizes of burrows, one small and containing larvae not over one-half inch long, and the other containing larvae about two inches long. One small burrow which we excavated was about four inches deep and had a diameter of one-sixteenth of an inch. The larger ones were a little less than one-half inch in diameter and about thirty inches deep. The rim was slightly elevated above the surface or surrounding level, and the entrance perfectly circular. The burrows have quite a characteristic way of going nearly straight down for about eighteen inches and then, turning to an angle of forty-five degrees downward, proceed about eighteen inches farther. This lower portion has a tendency to be feebly spiral. (See Pl. II, Fig. 16). The burrow for the last eight or ten inches is quite noticeably enlarged, especially laterally, and the extreme end is invariably tightly packed with the remains of former repasts. (See Pl. II, Fig. 14).

The holes are generally located on the brow of a cliff, but one colony, figured in Pl. II, Fig. 12, was found in muddy silt at the foot of a cliff-like bank, well below the recent flood level of the stream. Still others occurred on the high plain some

half a mile back from the bluffs. Two or three were found that had their openings in the face of the cliff. These sloped back and did not conform to the normal burrow. It was often noted that these larval colonies were situated near some larger hole, as that of the field mouse or badger.

Feeding Habits of Amblychila Larvae.

Careful observations were made in Wallace County in early Aug. of the habits of a colony of six larvae, and upon two, singly located, but conveniently near. The colony of six is figured in Pl. II, Fig. 13. One of the other solitary ones is shown in Pl. II, Fig. 14. The larval holes were on a level spot on the top of a twenty-foot cliff of sandy clay and a few feet from its brink. The said cliff defined the river bed and was at that time 300 feet from the flowing stream and extended for some distance along its side.

Observations were begun August 9th, shortly before sundown. The colony was roughly sketched and each hole numbered. When we arrived no larvae were at the surface, but at about dusk, cautiously, one by one, the brown "traps" were set, only to drop out of sight at the first disturbance.

One came near the top and, by taking a half turn, the mandibles scraped dust down upon the "trap" which made it more deceptive than ever.

A lantern was lighted and placed within a foot of the colony, but seemed not to disturb it. A beetle of the genus *Trox* was placed over the hole of No. 4. It was seized and dragged partly out of sight but as promptly brought up, lifted from the ground, and by a flip of the head, cast clear of the hole and the trap again set. A mantid (*Litaneutria*) was offered and seized by this same larva. This was at 7.41 P. M..

Number 2 took a moth offered from the forceps. Number 5 accepted a fly. Number 3, the largest of all the colony, was located in a hole, the mouth of which was one-half inch above the surrounding ground and close against the roots of a grass-clump. This larva greedily took a beetle of the genus *Lachnosterne*. The last one in the colony fairly jumped at an ant-lion adult offered it and drew it into its burrow with lightning

speed. None of the larvae returned to the surface after being fed.

Earlier the following evening the colony was again visited. The bank was searched for adults without success. The first larva appeared at or near its entrance at 6.35 P. M. The sky was one-half cloudy, wind from the south. This larva was one of the solitary ones and numbered 7. Number 6 was up at 6.39. Numbers 1 and 2 were up at 7.00 P. M. All "traps" were set by 7.03. A moment later a shout sent 1, 3 and 6 down. Number 7 seemed wild and more easily disturbed than the others; perhaps it, being alone, got more to eat and was less greedy. At 7.20 a *Pasimachus* (coleopter) was given to number 1. A struggle ensued. Twice the beetle managed to back to the surface only to be dragged from view again. Number 2 was offered a *Chalybion* (wasp) which it took. Buzzing was heard within for some moments later. Number 6 took a Mutillid. Number 4 a *Pelopoeus* wasp head first. Number 3 took the head from a *Cicindela* which was too tightly held in the forceps. Number 5 took a *Cicindela* as it ran over the hole. Number 8 took a pentatomid. This closed the observations for the two evenings.

We noted that the larvae of *Amblychila cylindriformis* were rather general feeders, the *Trox* alone being rejected.

The following morning the colony was visited. The body of the *Pelopoeus* (legs and wings gone) was found three inches from number 2 and the body of *Chalybion* two inches from number 2. Number 8 was carefully excavated, a small guide-straw being used. The plan of the burrow is shown in Pl. II, Fig. 14. The dimensions are there given.

The colony was also very carefully excavated. Guide-straws were used and the digging done from one side. (See Pl. II, Fig. 13), Each larva was placed in a vial bearing the number of the hole and the contents of each hole were placed in a vial similarly numbered.

In all but two holes, number 8, to which was fed the Pentatomid, and number 5, to which was given the *Cicindela*, we found the remains or parts of the food given the night before. In number 1 was found the *Pasimachus* one and a half inches

below the entrance, head downward and uninjured save that the claws were gone from the fore-tarsi. The larva was in the rear of the burrow and apparently unhurt. In number 2 the wings of the *Chalybion* were found just in front of the larva. In number 3 was found the frons of *Cicindela.* In number 4 the wings and legs of *Pelopoeus.* In number 5 the larva was not in the rear of the burrow but was found discolored and blackened for the first two-thirds of its length and in a stupor, apparently nearly dead. In referring to the notes of the night before, it was found that this one had taken the *Cicindela,* and it was evident that there had been a battle in which the rapid little tiger-beetle had got beyond the plated armor of the larva in that portion of the burrow where it widens out, and had won the struggle. In number 6 the abdomen of the Mutillid was found.

A table at the end of this paper gives these notes in a concise form.

As stated above, the extreme end of the burrow for a distance of two and a half inches was packed with refuse of former repasts. In several cases, as the sides of the burrows were carefully shaved away, there was an opportunity to see the larva naturally situated in its home. It was noted that as the larva grabbed at an object, the head would fly up and backward, the wave thus started would hump the back where the sharp prongs of the dorsal side could grasp the walls of the burrow.

Four of the larvae of this colony were placed in holes made for them in cans containing clay and accepted food normally. Three were carried thus through the remaining camping trips and brought safely to the laboratory and placed in vertical holes in sandy soil. About a week later two of the larvae blocked up the mouth of their tunnels so that the location of the latter could not be well determined. The third did not conceal its whereabouts but kept its burrow open. The larvae were all dead by Feb., 1911. The stopping up of the holes may perhaps be explained by the hibernating instinct of the larvae.

SUMMARY OF FEEDING HABITS OF AMBLYCHILA CYLINDRIFORMIS.

No.	Date	Time at Surface	Food Offered	Result	Remains of Food at Surface	Remains of Food in Burrow	Other food remains	Condition of Larva
1	Aug. 10	P.M. 7	Pasimachus	Attacked		Alive 1½ in. below surface, 5 tarsi gone		Normal
2	" 9 " 10	" 7	Moth Chalybion	Taken below " "	Chalybion body	Chalybion wings		"
3	" 9 " 10	" 7.03	Lachnosterna Cicindela	Taken below Head taken off		Frons of Cicindela		"
4	" 9 " 10 " 9	" " 7.04 " 7.41	Trox Pelopoeus Litaneutria	Taken then expelled Taken below " "	Body of Pelopoeus	Wings and legs of Pelopoeus		"
5	" 9 " 10	" dusk " 7.04	Fly Cicindela	" " " "				Badly chewed and discolored
6	" 9 " 10	" 7.04 " 6.39	ant-lion,adult Mutillid	" " " "		Abdomen of Mutillid		Normal
7	" 10	" 6.35						Normal
8	" 10	" 7.04	Pentatomid	" "				Normal

They came to surface to feed at dusk.

They are general insect feeders but they reject distasteful insects.

They may sometimes be overcome by the prey they have captured and sometimes fail to retain prey once caught.

In summer of 1911 the larval forms were found widely distributed in southwestern Kansas but the adults were scarce as ever.

FAM. HETEROCERIDAE.

Heterocerus sp.

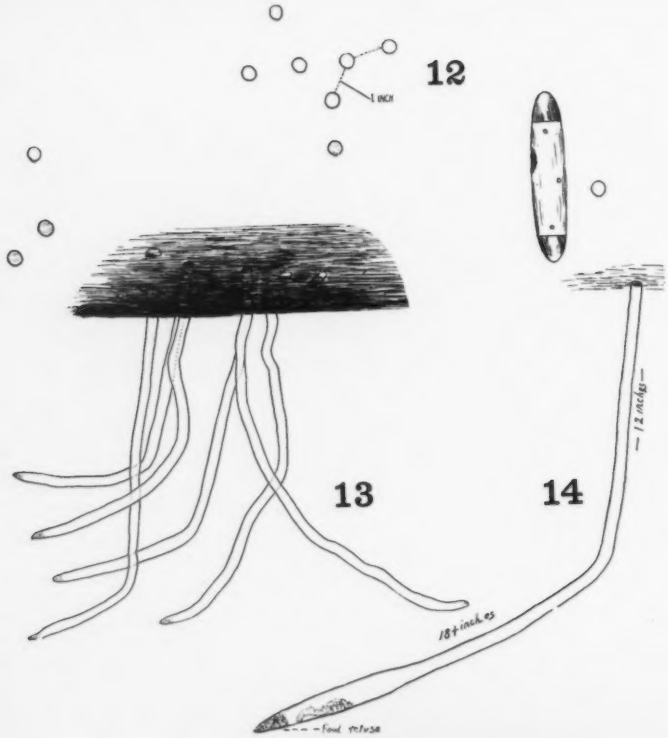
Along the shores of the Sappa Creek, in Rawlins Co., we took some beetles of this genus which live in peculiar little urn-shaped mud cases. These cases were set in the mud with the necks just showing above the level. A side and top view are shown in Pl. II, Fig. 15.

EXPLANATION OF PLATES I AND II.

Plate I. All figures enlarged.

Fig. 1. Egg of *Hornia gigantea* showing the enclosed embryo.

Fig. 2. Young triungulin of *Hornia gigantea* found in the nest of the bee, *Anthophora occidentalis*.



COLEOPTERA FROM KANSAS—WILLIAMS AND HUNGERFORD.

Fig. 3. Piece of cast larval skin of *Hornia gigantea.*
Fig. 4. Pupa of *Hornia gigantea.*
Fig. 5. ♂ type of *Hornia gigantea.*
Fig. 6. ♀ type of *Hornia gigantea.*
Fig. 7. Triungulin found on leg of the bee, *Anthophora occidentalis.*
Fig. 8. Head of ♂ cotype of *Hornia gigantea.*
Fig. 9. Maxillary palpus of ♂ type of *Hornia gigantea.*
Fig. 10. Fore tarsal claw of ♂ type of *Hornia gigantea.*
Fig. 11. Antenna of ♂ *Hornia gigantea.*

Plate II. All figures except Fig. 15 reduced.

Fig. 12. Bird's eye view of a colony of the larvae of *Amblychila cylindriformis,* on the sloping bank of White Woman Creek, Greeley County, Kansas, August, 1910. The penknife placed in the figure for comparison, is 3⅝ inches long. The shaded holes are closed.
Fig. 13. Vertical view of a colony of the larvae of *Amblychila cylindriformis,* Wallace County, Kansas, August, 1910.
Fig. 14. Vertical section through a tunnel of the larva of *Amblychila cylindriformis,* Wallace County, Kansas, August, 1910.
Fig. 15. Dorsal and lateral view of a mud nest of *Heterocerus* sp.
Fig. 16. Vertical section through a tunnel of the larva of *Amblychila cylindriformis,* Morton County, Kansas, August, 1911. Photo by Lovejoy.

The Species-status and the Species-concept.

By Charles H. T. Townsend, Lima, Peru.

The question as to what constitutes a species is as old as the science of biology. Nevertheless it is not yet satisfactorily answered. In the case of certain groups of plants and animals the answer is simple. These groups belong to old stocks that have long since passed through their period of evolutional activity, are no longer undergoing extensive variation and specialization, and have lost at least in great part the transitional forms that arose during the process of their evolution. But when we attempt to define a species in younger groups which are still undergoing extensive evolution, or have but recently reached the climax of multiform development, the answer is not simple. Examples of such groups are furnished by the Muscoidea among insects and by the Compositae among

plants. The difficulty to be overcome in these groups arises from the presence of a large number of the transitional forms and individuals that are always produced during the evolution of stocks. What is to be done in such case? It is clear that what suffices to meet the requirements of the one case will not meet the quite distinct requirements of the other. The species-concept must therefore be modified to such extent as is necessary for adapting it to the requirements of each case.

It has long been held that a species comprises all individuals whose interbreeding will produce fertile offspring. This can not now be accepted. Plants, insects, and even mammals, which the majority of biologists will agree are entitled to specific recognition, possess this power. We have only to recall the plants which have been successfully hybridized within recent years and insect species which have mated and produce fertile progeny. It is quite possible to secure fertile offspring from the union of certain distinct but closely allied species of flies, butterflies and beetles whose external sexual organs admit of mating. Instances of hybrid insect races are on record. It is not within the limits of this article to cite cases, but the records show it to be practically beyond question that in certain instances the spermatozoa of one species have the power to fertilize the ova of another and produce therefrom fertile individuals. Other definitions of species so far given, aside from the above, also fail to apply in young stocks.

The keynote of all biological investigative work is to verify and record faithfully the results of one's investigations. Such results form a sure basis for further investigations. It is certain that all systematists do not yet fully realize the significance of some of the unchallenged results so far obtained. As a profitable though *outré* illustration, true nevertheless to living conditions, we may imagine an immense extent of fertile land surface covered with a varied and teeming flora and fauna still more or less in process of evolution and subjected to all the varied combinations of conditions that will support life. We may further imagine for the moment that we are not only intimately acquainted with each of the practically innumerable

forms and individuals that compose this flora and fauna, but also that we are able to follow out in sequence all the lines of their issue through a period of a few millions of years. What would be the result of our observations in such case? It is certain that we would see many forms drop out, we would see many new ones arise, we would see great variations in some and less variation in others, we would see some persist in nearly their original form; but most important of all from a taxonomic and phylogenetic point of view we would witness the production of hordes and multitudes of transitional individuals and forms that would quite effectually clog any known system of classification, were they assembled with the typical forms in their entirety. At any given time in the production of these transitionals, the living residue would show plainer lines of separation, but specific and other limitations among them would not be amenable to current methods. These conditions are actually exemplified today in certain young stocks inhabiting favored regions. There are stocks of Muscoidea and Compositae in the Andean montanya whose progenitors have almost certainly been in that region or an equally favored contiguous area for the past two or three millions of years, and their living forms in many instances exemplify the conditions just mentioned. While this region is probably the most highly favored in this respect in the world, it is certain that many other regions exist both in and out of the tropics where similar conditions are exemplified by these and other young stocks. Many muscoid groups exhibit today in various parts of the world so many transitional forms and individuals that we have long been unable conveniently to classify them. Yet we know that these groups have already lost many of the transitional forms, together with immense hosts of transitional individuals, that arose during their evolution up to the present time. What conclusion can we draw from these facts? Simply that there exist in nature, among groups of young stocks undergoing active evolution, no well defined or fixed species limits; but that there certainly exist aggregations of individuals observing some general specific bounds which suffice to meet the

requirements put upon them by varying natural conditions, or failing to meet them perish.

This phase of biologic inquiry can, in a measure, be likened to infinity. In theory infinity is incomprehensible, but we comprehend parts of it in practice. Theoretically there is almost no limit to the morphologic variety that life may assume, but practically it is limited to such morphology as we know or can base on that which is known. When we come to consider the limits of species we find that in practice as well as theory they have among themselves no natural sequential or genetic limits, and often no residue limits at any given point in their development, but nevertheless they certainly exist under both conditions, however obscured may be their limits. Were we able to restore and gather together all the individuals that have arisen during the evolution of species on this globe up to the present day, we would find few or no places where we could draw natural lines of division between categories of individuals. In practice, however, among the living residue of today, the limits of natural species are such as they make for themselves. It remains for us to find these limits out. The illustrations which I have used may be judged as forced and far-fetched, but they are true to nature and therefore their forcefulness is the more serviceable.

Variation even among existing forms has almost no limits. The number of possible combinations of the characters of organisms, past, present and future, is almost infinity itself. The best that we can do in the present with the great plastic mass of living young forms is to divide it as conveniently as we may, conforming to phylogenetic lines as closely as it is possible to interpret them. It is certain that in highly specialized and comparatively recent groups we gain simplicity and conciseness as we descend in the taxonomic scale and diminish the scope of our units of treatment. This applies not only to groups but to genera, subgenera, species, subspecies and races. It arises from the contraction of taxonomic values obtaining in such stocks. We need to apply a restricted species-concept in dealing with these forms, as well as employ restricted groups and categories in general.

It appears possible to define a species as an aggregation of individuals which in the majority of cases breed together under normal conditions and produce fertile offspring. This seems true, but it is incapable of application with immediate final results in the case of young stocks. The chief difficulty lies in determining what are the limits of the normal fertile variants of species in such stocks. Long series of observations must be carried out to establish the normal self-observed limits of such species in nature. This labor must here often follow instead of preceding a working species-concept, because we need names under which to record our results during the carrying out of the necessary investigations. By the normal self-observed limits of species in nature is meant their limits in the long run, divested of exceptions and vacillations. It is useless to attempt to solve such problems merely by the study of dead material. The living phases, functions and environment of the material must be studied as well, and that diligently.

Thus it is safe to say that each species will have to be worked out eventually on its own merits and standing. As this cannot be done at once, our working concept must be a tentative one that will apply now for such cases. It must be plastic, but of such nature that it will cause no future confusion or perversion of recorded facts that belong with it. How shall we gain the practicable end of a working species-concept for dealing with the forms exhibited by young stocks? It seems that the best way to do this, because the simplest and most thoroughly guarded against error, is to bestow a name upon every form at all abundant in individuals that can be distinguished as different from other forms—every form that we can sense and characterize as a different form, regardless of the presence or absence of transitional individuals, of interbreeding limits, or of other than an approximate constancy of characters—and to consider that form as a tentative restricted species. Such plan will not interfere with the subsequent proper tabulation of forms as subspecies and races, when our knowledge is sufficiently complete to warrant it.

Individual-occurrences should not be confused with form-

occurrences. Transitional individuals or means of variation occur linking together extremes of variation that seem to have been derived from the same specific stock. The extremes need names if they are abundant enough in individuals to constitute form-occurrences; so do the means if they are similarly abundant and capable of characterization. But isolated transitionals and those of slight differentiation may be recorded by noting their degree of divergence from one or other of the named forms. In this manner exact and concise records are preserved of each individual form and its variations. Such records are indispensable in both present and future work. These forms are in many cases potential if not actual species, and all of them need to be recorded now.

The lumping of recognizable forms under one name is a most serious taxonomic offense, unless in each case the precise limits of divergence from the typical form are shown. An immense number of muscoid names has been thrown into the synonymy within recent years, not only in America but also especially in Europe. No doubt some of these belong there, but it is very probable that many might be profitably employed for the recognition of localized and various transitional forms among these highly versatile flies.

The foregoing remarks at least throw some light on what may be termed the species-status in nature, and it is believed that they demonstrate the need of a modified species-concept for application in young stocks. It will be useful to summarize the main points.

Summary.

1. In old stocks, species have normal values and well defined limits, because evolution has become inactive in those stocks and maturity has been attained by the forms.

2. In young stocks, the contraction of taxonomic values due to youth restricts the scope of species, and the presence of many transitionals due to active evolution obscures their limits.

3. Therefore the species-status is not uniform in old and young stocks, and the species-concept must be modified to agree with it.

4. Though transitionals obscure limiting lines in dead material, species exist in young stocks and the actual limits of each are such as it makes for itself by the general interbreeding of its constituents under normal conditions.

5. The normal self-observed limits of species in nature among young stocks must be worked out on the merits of each case by the study of living material through all its stages with relation to its environment.

6. As a basis for this work all recognizable forms in young stocks must be described, named and regarded as tentative species until their status is finally determined.

7. All recognizable forms in young stocks demand a name and final place in the taxonomic system down to race rank, and none should be lost sight of by lumping of names.

8. Isolated or aberrant transitionals need no distinctive name, but as a matter of record they should be descriptively differentiated from that form which they most closely approach.

9. It follows that the describing and naming of forms in young stocks should be based on as large series as possible.

Notes on the Thoracic Sclerites of Winged Insects.*

By G. C. CRAMPTON, Ph.D.

(Plate III.)

As used by most anatomists, the term *dorsum* is applied to the entire upper or dorsal surface of an insect's body; the entire side, or lateral portion of the body is termed the *latus;* and the entire lower or ventral surface is termed the *venter.* To avoid confusion, these terms should be used in this sense alone.

The entire dorsal region of each segment (i. e. the more membranous, as well as the more strongly chitinized portions of the body wall) is termed the *tergum,* or *notum;* the entire lateral region of each segment is termed the *pleuron* (both flanks being termed the *pleura*); and the entire ventral region

*Contribution from the Entomological Laboratory of the Massachusetts Agricultural College, Amherst, Mass.

of each segment is termed the *sternum*. The sclerites (either distinct plates, or subdivisions of the more strongly chitinized regions marked off by sutures) of the tergum are called *tergites;* those of the pleural region are called *pleurites;* and those of the sternal region are termed *sternites*. Unless confusion is to continue to reign in the terminology applied to the thoracic sclerites we must hold rigidly to the simple and logical usage given above.

From the study of the larval forms of insects, and the more primitive representatives of the order, it would appear that the thoracic sclerites were originally formed as numerous plates formed by depositions of pigment and chitin, due (in all probability) to the stimulus of muscular tension, and to other mechanical stimuli, such as friction. As specialization progresses, there is a marked tendency for these originally distinct plates to unite, or fuse together; and by the breaking up into parts (*derivatives*) of the original plates, by the re-combination of these parts fusing with other sclerites, and by the formation of secondary sutures (i. e. those not originally present), the modifications of the original typical or "ground-plan" met with in the different orders of insects, are brought about.

The hypothetical "ground-plan" of thorax shown in Plate III, Fig. 2, is more of a composite, or combination of the possible conditions met with in different winged insects, than an attempted reconstruction of the original condition found in the ancestors of these insects. It nevertheless approaches the original condition, in many respects. The plates which were originally separate and distinct are, for the most part, so represented in the figure. The greater part of the sutures originally present, or those early formed, are designated by heavy lines; while those added as later modifications (i. e. secondary sutures), are indicated by dotted lines. Although the types of thoracic sclerites represented in the following series do not cover all of the conditions met with in winged insects, it is a comparatively simple matter to reduce any of them to some one of the types here represented. The principal sclerites of the tergal, pleural and sternal regions may be briefly described as follows:

TERGITES—There are two principal plates found in the tergal region of winged insects. These are the *scutoscutellum,* or large anterior plate *Scsl* (Fig. 2), and the *postscutellum,* or smaller posterior plate *Psl. The* scutoscutellum bears the wing, or the wing articulates with its lateral margin. The postscutellum is not connected with the wing in any insects thus far observed. In some insects the scutoscutellum is connected with the pleural region by a pre-alar bridge, or connecting sclerite *Pal* (Figs. 2 and 5), extending in front of the wing; while the postscutellum is usually connected with the pleural region by a post-alar bridge *Plph* (Fig. 2), extending behind the wing.

There frequently occur *"implexes"* (i. e., any in-folding, or in-pocketing of the integument) which serve the double purpose of affording better attachment for the muscles, and of strengthening, or rendering more rigid, the sclerites in which they occur. The outward manifestation of such an "implex," or internal fold, is an external groove or suture, formed by the meeting of the external lips of the fold. Naturally, these folds, or plaits, are composed of two plates. These may be so closely applied to each other as to appear as a single plate. Both plates may be equally strongly chitinized, or one may be strongly chitinized and the other membranous.

The transverse "implexes" of the tergal region are termed *phragmas,* and these occur at the dividing line between two consecutive segments, so that the anterior plate of the phragma may be considered to belong to the segment in front, and the posterior one to the segment behind. If the anterior plate of the two which make the phragma is strongly chitinized while the other is membranous, the phragma appears to belong entirely to the segment in front. If the posterior one is strongly chitinized, while the other is membranous, the phragma appears to belong to the segment behind. The anterior plate of the tergal region (i. e., the scutoscutellum, mentioned above) may bear a phragma at its anterior margin, or the posterior tergal plate (i. e., the postscutellum) may bear a phragma along its posterior margin.

The anterior tergal plate *Scsl* (Fig. 2) may be further di-

vided by sutures (with, or without corresponding internal folds) into a number of subregions, or subdivisions. The foremost of these is a narrow, transverse region, the *pretergite, Am* (Figs. 2, 4, 5 and 6), lateral to which is the *prealare, Pal* (Figs. 2, 4 and 5). Behind the region *Am* is the *prescutum, Psc* (Figs. 2. 4, 5 and 6). Following the prescutum is the *scutum, Sc* (Figs. 2, 4, 5 and 6). Situated somewhat anteriorly and laterally to the scutum is a narrow sclerite, the *supraalare, At* (Figs. 2, 4, 5 and 6), with which the wing veins articulate by means of a small movable, or articulatory plate, the *notopterale, Npt* (Figs. 2, 4, 5 and 6). (These articulatory plates by means of which the wing veins articulate with the tergal plate, have been recently termed the *pteralia*). Situated in the incision between the sclerites *Pal* and *At*, is the *tegula*, or *parapteron, Tg* (Figs. 2, 4, 5 and 6). The scutum, *Sc*, may be divided into subregions by the formation of sutures, or even a transverse fissure. The principal subdivision is the *juxtascutellum, Jsl* (Fig. 2) situated on either side of the *scutellum, Sl* (Figs. 2, 4, 5 and 6). The sclerite *Jsl* is not marked off in the insects figured in the series here given, but occurs in the Diptera and Hymenoptera. An articulatory extension of the scutum, termed the *anal pterale, Scpt* (Fig. 2), becomes detached in the higher insects, and forms one of the pteralia mentioned above. A narrow, posterior, marginal sclerite, the *postergite, Pm* (Figs. 2, 4, 5 and 6) is the hindmost of the subdivisions of the tergal plate *Scsl*. It sometimes occurs as a posteriorly-projecting, fold-like region of this plate. A median dorsal suture (with its corresponding internal fold, or "implex") called the mid-dorsal suture may partially divide the tergal plate into symmetrical halves.

The posterior tergal plate, or postscutellum *Psl* (Figs. 2, 4 and 5), is not connected with the wing, but is usually connected with the pleural region in the higher insects, as was mentioned above. The postscutellum consists of an external region (the "phragmite") and an internal portion, the phragma. The external region of the postscutellum, in some insects is divided into a median region, the *"mediophragmite," Mph*

(Fig. 2), and a lateral portion (one on either side), the *pleurophragmite, Plph* (Fig. 2). These are best seen in the Diptera and Odonata. The postscutellar plates *Psl* (Fig. 6) of the cockroach, doubtless are the representatives of the postscutellum in other insects.

The various subdivisions of the tergal plates described above, are not met with in all insects, those usually present being the prescutum (*Psc*), the scutum (*Sc*), the scutellum (*Sl*), and the postscutellum (*Psl*).

The small tergal plates, or *intertergites, It* (Fig. 4) occurring in front of the anterior tergal plate in such insects as *Corydalis,* are doubtless homologous with the dorsal cervical sclerites *It* (Fig. 3) occurring in front of the pronotum of the cockroach and other insects. These will be discussed under the consideration of the intersegmental sclerites.

PLEURITES—Situated immediately below the wing is a subalar plate, the *subalare, Asa* (Figs. 2, 4, 5 and 6). There are sometimes two of these, an anterior and posterior subalare, *Asa* and *Psa* (Fig. 5), but only the anterior one is large enough to be of any importance. The principal plate of the pleural region is the *eupleurite,* composed of the regions *Em, Es* and *Lpl* (Figs. 1 and 2). This was in all probability a single plate originally, but later became divided into a number of sub-regions by the formation of sutures. A more or less oblique infolding of the integument whose external manifestation in the pleural suture *g* (of all figures) extends from the top of this plate to the bottom of it. Internally, an "implex" or ridge called the *pleural ridge,* or *apodeme,* likewise extends from top to bottom on the inner surface of the plate. The region immediately posterior to the pleural suture *g,* is the *epimeron, Em* (in all figures). The epimeron may be subdivided into an upper and a lower region *Ppl* and *Hem* (Figs. 2 and 4) in such insects as *Mantispa, Chrysopa,* etc., but this is of somewhat rare occurrence.

The region immediately anterior to the pleural suture *g* is the *episternum, Es* (in all figures). In the mesothorax of the earwig, the formation of a second suture *e* (Fig. 1) marks off the *lateropleurite, Lpl,* from the remainder of the pleural plate.

A lateral plate of the sternal region, the *laterosternite, Lst* (Fig. 1) may become detached from the sternal region and unite with the sclerite *Lpl* (Fig. 1) to form a pre-coxal bridge *Lat* (Fig. 3) extending in front of the coxa, and connecting the pleural with the sternal region. This pre-coxal bridge may then be divided by a suture *b* (Fig. 3) into an anterior region, the *precoxale, Pcx* (Fig. 1) and a narrow posterior region, the *antecoxale,* or "antecoxal piece" of recent writers, *Acx* (Figs. 3 and 6). The precoxal bridge, however, is usually indistinguishably united with the episternum above, and with the sternum below, in the higher insects.

A secondary suture *d* (Figs. 2, 4, 5 and 6) marks off an upper region, or *anepisternum, Aes,* in the dorsal region of the pleural plate, and this small region is usually mistaken for the episternum in such cases, although the episternum *always extends from the top to the bottom of the pleural plate.* Two small "derivatives" of the region *Aes,* at the base of the wing, may be more or less completely detached from this region to form the anterior and posterior *basalare,* or basalar plates, *Aba* and *Pba* (Figs. 2, 4, 5 and 6).

The triangular plate termed the *trochantin, Tn* (Figs. 1, 2 and 6) may possibly be a detached sclerite of the pleural plate, although it is regarded by some writers as a detached portion of the coxa. The trochantin may be divided by an oblique suture into an anterior and posterior region as in Fig. 6 (*Tn*); it may be divided into two distinct plates as in Fig. 1 (*Tn*) by splitting up obliquely; or it may split up transversely into two distinct plates as in Fig. 3. The smaller of the two plates is the *trochantinelle, Tnl* (Fig. 3). The dorsal portion of the trochantin may unite with the pleural plate, and by a continuation of the suture *b* (Fig. 2) a composite region, the *pleurotrochantin, Ptn* (Fig. 4) is formed. This is not to be considered as the trochantin alone, as is done by most writers.

There occurs in some insects, a post-coxal sclerite, the *postcoxale, Poc* (Fig. 2) which may unite with the lower portion of the epimeron and with the sternite *Fs* to form a post-coxal bridge *Poc* (Fig. 4) connecting the pleural with the sternal region. There may thus be a pre-coxal and a post-coxal bridge connecting the pleural and sternal regions.

In front of the pleural plate, there occur, in some insects, a small group of plates, the *interpleurites, Ip* (Figs. 2, 3 and 4) which will be discussed with the remainder of the intersegmental plates under the heading intersegmentalia. In addition to these may be mentioned the *peritreme, Pt* (Figs. 1, 2, 4, 5 and 6), which surrounds the spiracle or breathing pore. The spiracle is regarded by many investigators as belonging to the segment behind it.

STERNITES—In such primitive insects as the stoneflies *Capnia* and *Leuctra,* there are five distinct sclerites in the sternal region, and traces of certain of these sternites are preserved in some insects, although the most of them disappear in the higher forms, either through fusion with each other, or through a fading out of the pigment and the softening of the chitinous deposits which formed them.

The sternite which is tentatively designated as the foremost of the principal sternal sclerites, is the *prebasisternite, Pbs* (Figs. 2, 3 and 5), which is probably a derivative (or detached portion) of the large sternite behind it, called the *basisternite, Bs* (Figs. 1, 2, 3, 4, 5 and 6). The basisternite, as the name implies, forms the lower portion of the sternum in many insects; its lateral wings *Lst,* previously described, forming the sternal portion of the flanks. These lateral extensions may become detached to form separate plates, the *laterosternites, Lst* (Fig. 1) as in the earwig, or they may remain connected with the sternum, and unite with the pleural plate to form a pre-coxal bridge extending between the pleural and sternal regions. The basisternite may be split up by diagonal fissures, into four sclerites, as in the prothorax of the roach *Ectobia* (Fig. 3, *Bs*). The basisternite is retained in practically all insects, and forms the principal sclerite of the sternal region.

Behind the basisternite is the *furcasternite, Fs* (Figs. 1, 2, 3, 4, 5 and 6). As the name implies, it bears the *furca,* or fork-like *apophyses* (internal sternal processes). The apophyses may be separated from each other, one on either side of the median ventral line (i. e., *diapophyses*), or they may approach each other in the median line, and their bases unite,

while their distal extremities remain separated to form the arms of the fork.

Following the furcasternite is the *postfurcasternite, Pfs* (Figs. 2 and 5), and behind this is the *spinasternite, Ss* (Figs. 1, 2, 3, 4, 5 and 6), so called because it bears the *spina,* or unpaired median apophysis (*monapophysis*). It has not yet been determined whether or not the spinasternite is the foremost or the hindmost of the sternites, but it is here treated as though it were the hindmost.

The internal projections of the sternal region are termed *apophyses.* In order to distinguish the paired from the unpaired apophyses, the terms *diapophyses* and *monapophysis* may be used to designate the two types.

A median ventral fold, the mid-ventral "implex," with its corresponding external suture, frequently partly divides the sternal sclerites into symmetrical halves. It, however, is absent in many insects.

All of the sternites mentioned above are not preserved in the higher insects, the two usually represented being the basisternite and the furcasternite (called the antecoxal piece by the older writers). The prebasisternite is retained in the prothorax of certain lower forms, and two derivatives, or detached portions, of this region occur as narrow transverse plates, the *intersternites, Is* (Figs. 2 and 3), in the prosternum of the earwig and roach.

INTERSEGMENTALIA—The term *intersegmental plates,* or *intersegmentalia* is applied to the small sclerites situated between the segments. These plates, in all probability, belong partly to the segment in front of them, partly to the segment behind them, and are therefore not to be considered as vestiges of reduced segments in the process of becoming lost.

The dorsal intersegmentals are the *intertergites, It* (Figs. 2, 3 and 4). They occur in front of the mesonotum of *Corydalis* (Fig. 4, *It*) and in front of the pronotum of the roach (Fig. 3, *It*). Those in front of the pronotum are called the dorsal cervicals (*cervicalia*). The dorsal intersegmentals are probably detached plates belonging to the segment in front of them.

The lateral intersegmentals are the *interpleurites, Ip* (Figs. 2, 3, 4 and 5), and the postcoxale, *Poc* (Fig. 4) might possibly be likewise included under the designation lateral intersegmentals. There are two well developed interpleurites in front of the pleuron of the mesothorax in *Corydalis*. The posterior one is much the larger, and probably belongs to the segment behind it, while the anterior one may belong to the segment in front. The anterior interpleurite in this insect bears an internal process for muscle attachment. The interpleurites *Ip* (Fig. 3) in front of the pleuron of the prothorax in the roach, are called the *lateral cervicals.*

The ventral intersegmentals are the prebasisternite *Pbs* (Figs. 2, 3 and 5), the intersternites, *Is* (Figs. 2 and 3), and possibly the spinasternite, *Ss* (Figs. 2, 3 and 5). The prebasisternum and intersternites, *Pbs* and *Is* (Fig. 3) in front of the prosternum of the roach, earwig, etc., are termed the *ventral cervicals.* All of these sternites appear to be parts of the segment behind them.

It is thus apparent that the cervical sclerites (cervicalia) are in all probability homologous with the intersegmental sclerites (intersegmentalia) in front of the other thoracic sclerites, and these doubtless belong partly to the segment behind them, partly to the segment in front. It is thus as incorrect to regard the cervical sclerites as representing the entire labial segment, as it would be to regard the intersegmental sclerites in front of the metathorax as representing the entire mesothoracic segment; for these intersegmental (and cervical) sclerites belong partly to the segment behind them, partly to the segment in front, as we have seen.

The region containing the cervical sclerites is the *veracervix*, or *"cervicum."* It would be simpler to designate this region as the cervix, since it is the true neck region, but the term cervix is always applied to the constricted occipital region of the head; on this account the "manufactured" term "cervicum," or the compound term veracervix is preferable. The function of the neck region is to enable the head to turn more readily.

EXPLANATION OF PLATE III.

Fig. 1. Mesothorax of the earwig *Forficula.*

Fig. 2. "Ground plan" of typical thoracic segment.

Fig. 3. Prothorax of roach. Pleural region as in *Periplaneta;* sternal region as in *Ectobia.*

Fig. 4. Mesothorax of *Corydalis.*

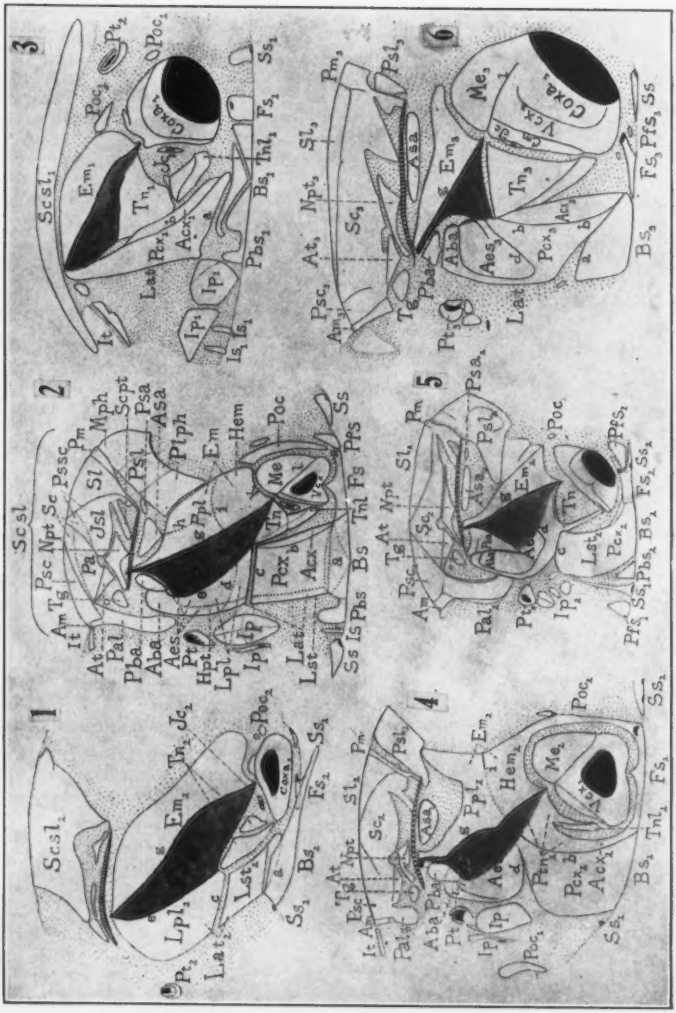
Fig. 5. Mesothorax of stonefly. Pleural region as in *Perla;* sternal region as in *Capnia* and *Leuctra.*

Fig. 6. Metathorax of roach. Pleural region as in *Ischnoptera* (male); sternal region as in mesothorax of *Periplaneta.*

All figures are so oriented that the dorsal region is directed toward the top of the page, and the anterior portion toward the left hand margin, the plate being held sidewise to read the abbreviations. All show lateral views. The coxae are partly cut off in all figures. Black areas denote cavities, or the location of internal processes.

a, Suture betweeen basisternite (Bs) and laterosternite (Lst).
Aba, Anterior basalare.
Acx, Antecoxale.
Aes, Anepisternum.
Am, Pretergite.
Asa, Anterior subalare.
At, Supraalare.
b, Suture between antecoxale (Acx) and precoxale (Pcx).
Bs, Basisternite.
c, Suture betweeen laterosternite (Lst) and lateropleurite (Lpl).
Cm, Coxamarginale.
d, Suture marking off anepisternum (Aes).
e, Suture between episternum (Es) and lateropleurite (Lpl).
Em, Epimeron.
Es, Episternum.
Fs, Furcasternite.
g, Pleural suture (between episternum and epimeron).
h, Suture below subalar sclerite (Asa).
Hem, Hypoepimeron.
Hpt, Hypopteron.
i, Suture dividing epimeron (Em) into upper and lower regions.
Ip, Interpleurites.
Is, Intersternites.
It, Intertergites.
Jc, Juxtacoxale.
Jsl, Juxtascutellum.
k, Suture between epimeron (Em) and meron (Me).
l, Meral suture (between meron and anterior portion of coxa).
Lat, Laterale.
Lpl, Lateropleurite.
Lst, Laterosternite.
m, Suture between episternum (Es) and trochantin (Tn).
Me, Meron.*
Mph, Mediophragmite.
Npt, Notopterale.
Pal, Prealare.
Pba, Posterior basalare.

* In the Diptera, the term *meropleurite* is applied to the meron united with the lower portion of the epimeron.



THORACIC SCLERITES OF WINGED INSECTS—CRAMPTON.

Pbs, Prebasisternite.
Pcx, Precoxale.
Pfs, Postfurcasternite.
Plph, Pleurophragmite.
Pm, Posttergite.
Poc, Postcoxale.
Ppl, Pteropleurite.
Psa, Posterior subalare.
Psc, Prescutum.
Psl, Postscutellum.
Pt, Peritreme.
Ptn, Pleurotrochantin.
Sc, Scutum.
Scpt, Analpterale.
Scsl, Scutoscutellum.
Sl, Scutellum.
Ss, Spinasternite.
Tg, Tegula, or parapteron.
Tn, Trochantin.
Tnl, Trochantinelle.
Vcx, Veracoxa.

The subscripts 1, 2 and 3, denote that the sclerite in question belongs to the prothorax, mesothorax and metathorax respectively.

A new Megastigmid from Queensland, Australia (Hym., Chalcidoidea).

By A. A. GIRAULT, Nelson (Cairns), N. Q., Australia.

The following species belongs to a genus heretofore known from Java only but seems to differ from the type of it in bearing a petiolate abdomen.

Spilomegastigmus flavus new species.

Female.—Length, 2 mm., excluding ovipositor which is slightly longer than the abdomen, their valves black. Wings hyaline excepting the stigma; abdomen with a distinct petiole which, however, is not very much longer than wide. Honey yellow the abdomen with transverse short stripes of black; legs and scape pale yellow, the flagellum dusky. Mesoscutum and scutellum transversely wrinkled, the latter without a cross furrow. Mandibles bidentate. Antennae slender, 11-jointed, the club solid, one ring joint; all funicle joints longer than wide, the first three subequal, longest, much longer than the pedicel. Head smooth.

(From one specimen, 2-3-inch objective, 1-inch optic, Bausch and Lomb.)

Male.—Not known.

Described from one female captured by sweeping in a forest, April 1, 1913 (A. P. Dodd).

Habitat: Australia—Nelson (Cairns), Queensland.

Type: In the Queensland Museum, Brisbane, the above specimen on a tag and the head in xylol-balsam on a slide.

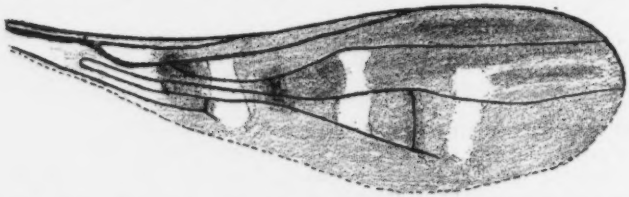
*ENT. NEWS, XXIII, 392-94, 1912.

The Male of Syringogaster brunnea Cresson, from Peru (Dipt.).

By E. T. Cresson, Jr., Academy of Natural Sciences, Philadelphia, Pa.

Among some material from Callanga, Peru, in the collection of the Hungarian National Museum, Dr. K. Kertesz found a specimen of the genus *Syringogaster* which he determined as my *brunnea,* although not agreeing with the description in many respects. He sent it to me for verification, and it proved to be the unknown male of that species, or at least I consider it as such, with the following differences:

Frontal median triangle polished, as is also the female to some extent. Posterior half of thorax black with the area about humeri rufous (this black discoloration may be caused by the chemical action on the pin.) Abdomen subopake, not polished as in female, brown with two



yellow bands on the narrow first and second segments; genital segment yellow, longer than broad, extending to apex of fourth beneath. Anterior tibiae brown; posterior femora discolored on the inside. Wing venation and maculation as figured, the third vein being bent beyond small cross vein, while that of the female is straight.

The species having been described from Costa Rica, this discovery also gives an interesting extension to its distribution. It may be explained here, in case there be some misunderstanding, that what is considered the fused first and second abdominal segments, may be all one segment, but as understood in the typical description,* the first segment is the narrow portion while the second is the dilated portion. The two are sometimes readily distinguished by a faint impressed transverse line between them.

The Identity of Two Insects, each Described by Ashmead as Megastigmus flavipes (Hym.).

By C. R. Crosby, Ithaca, N. Y.

In 1886 Ashmead described *Megastigmus flavipes* (Transactions of the American Entomological Society; v. 13: p. 128). In the United States National Museum there remains the pin on which the type was originally mounted, glued to a pasteboard triangle. Only the hind legs and one front wing remain. The stigmal club is large, very dark colored, and appears to be surrounded by a narrow clearly defined cloud. These characters prove it to be a true *Megastigmus*.

In 1888 Dr. Ashmead described another insect under the same name, *Megastigmus flavipes*. (In Bulletin 3, Kansas Agricultural Experiment Station: p. 111). Through the kindness of Professors T. J. Headlee and G. A. Dean, I have been able to examine the type of this species. It is a male *Torymus*. In transferring it to that genus, we find the name *Torymus flavipes* preoccupied by *Callimome flavipes* Walker (Entomological Magazine; v. 1: p. 124. 1833) also a true *Torymus*. It, therefore, becomes necessary to change the name of Ashmead's species, and as the original description was very inadequate, I have drawn up the following:

Torymus abortus new name.

1888 *Megastigmus flavipes* Ashmead. Kansas Agricultural Experiment Station Bulletin 3: p. 111.

Not Megastigmus flavipes Ashmead. Transactions of the American Entomological Society; v. 13: p. 128. 1886.

Not Callimome [=*Torymus*] *flavipes* Walker. Entomological Magazine; v. 1: p. 124. 1833.

Male.—Length, 1.5 mm. Head and thorax metallic greenish blue. Front and face finely reticulate-punctate, vertex becoming delicately transversely rugulose. Antennae dusky. Posteriorly on the thorax and on the pleurae a brownish ground-color shows through the green. Dorsum of thorax finely and densely pustulate; no transverse stria on scutellum. Propodeum not in a position for study. Pleurae and coxae brownish with greenish metallic reflections. Abdomen dark brown with aeneous reflections.

Front and middle legs pale yellow; hind femora and tibiae broadly infuscate. Wings hyaline.

A new Lycaena from Arizona (Lep.)

By Victor L. Clémence, Pasadena, Cal.

Lycaena florencia, new species.

Expanse, 15 to 24 mm.

♂—Upperside: Light violet blue (blue violet No. 487*), lighter towards the costa and veins; fimbriate black border on all wings, fringes white.

Underside: Ground color greyish-white, spots similar to *hanno,* only very much less intense; secondaries, spots also like *hanno* excepting for the metallic marks which are distributed in the new species as follows: The black eye-spot has a metallic half-circle on the outer side; a round, black spot covered with metallic scales above and two such spots, but smaller, below.

♀—Upperside: Mouse color, dusted with sky-blue scales from the base outwardly; secondaries are dusted in the same way, the anal spot of secondaries showing through indistinctly in both males and females.

Underside: Same as male.

Habitat: Southern Arizona (Huachuca Mountains, May and June, Clémence); Brawley, Imperial Valley, California, May; Yuma, Arizona, June, W. G. Wright.

Types: 2 males, 2 females, from a series of 14 specimens in the collection of V. L. Clémence.

Comparing *Lycaena florencia* with *hanno,* its nearest relative, the following comparative table will enable students to readily separate these two species:

florencia.	*hanno.*
Size: 15 to 24 mm.	Size: 18 to 27 mm.
♂ Upper side: Light violet blue No. 487. A black fimbriate border. Slight reflection of anal spot from under side.	♂ Upper side: Bright purplish blue (Holland). Very wide black border. A distinct black anal spot.
♀ Upper side: Mouse color dusted with sky-blue scales.	♀ Upper side: Dark purplish blue (Holland).
Under side ♂ ♀: Even light gray, spots very light brown.	Under side ♂ ♀: Brownish gray with broad dark border. Spots dark brown and black.
Four metallic spots.	Two metallic spots.

*Klincksieck et Valette, Code des couleurs, 1908.

There are, in my series, three *florencia* with only three metallic spots, but these specimens are worn and these delicate marks may have become erased.

This interesting *Lycaena* was taken by me in 1910 while collecting in the Huachuca Mountains, Southern Arizona; it was taken in company with *isola*, but whereas *isola* occurred in great numbers, *florencia* was rarely met with, and I considered myself fortunate to take from one to three specimens in a day's collecting while without any difficulty hundreds of *isola* could be secured. Of course the striking difference of the heavy marginal row of spots on the underside of the primaries in *isola* made the two species easily distinguishable, and also the fact that *florencia* is two-thirds of the size of *isola*. It is very distinct, in fact it is not like any other *Lycaena* in appearance, the pale blue of the upper side and its small size being the distinguishable characteristics of this species. This little insect, like most of the *Lycaenae*, is very fond of settling on damp sand bordering the canyon streams.

One evening in last May while doing some entomological work with my friend, Mr. Fordyce Grinnell, Jr., our attention was attracted to some *Lycaenae* from Florida which were not yet classified, and this caused a comparison between these and a series from Arizona which I had labeled *hanno* according to Wright's description in *The Butterflies of the West Coast*. We immediately saw the great difference existing between the Florida specimens and the Arizona ones; at once we started a search through the literature and discovered that the locality of *hanno* is the Gulf States, therefore, the Arizona species were not as Mr. Wright figures them but a new species which I take pleasure in introducing to Lepidopterists.

I have named this new species after my wife, Florence M. Clémence, who is also greatly interested in the collecting of Lepidoptera and has done some good work in Colorado and other places and so added materially to my collection.

Change of Address.

Mr. Henry W. Wenzel has removed from 1523 South 13th Street to 5614 Stewart Street, Philadelphia, Pa., and requests his friends and correspondents to take note of the change.

A new Chalcidid Genus and Species of Hymenoptera from Australia.

By A. A. GIRAULT, Nelson (Cairns) North Queensland, Australia.

This new genus was captured by sweeping foliage and grass along the banks of the Cape River at Capeville, Queensland, January 8, 1913. It is the second endemic genus of its tribe from Australia.

Family CHALCIDIDAE, Tribe CHALCITELLINI.

Chalcitelloides new genus.

Female:—Agreeing with the description of *Chalcitella* Westwood but the antennae only 10-jointed, without a ring-joint, the club solid. The fore wings without post-marginal or stigmal veins, the marginal long, slender and truncate at apex. Posterior femur beneath with eight teeth, the distal two small and equal; scutellum ending in a minute tooth. Venter of propodeum with a pair of stout teeth pointing ventrad. Petiole of abdomen as long as the hind coxae. Posterior tibiae *with* a small acute tooth outwardly near base (proximal third); wings hyaline. Propodeum with a median carina.

Male:—Not known.

Type:—The following species.

Chalcitelloides nigriscutum new species.

Female.—Length, 3.00 mm.

Blood red, the wings hyaline, the mesoscutum and axillae black; also the venter of thorax, the lateral pieces of the scutellum and an oval spot in center of posterior coxa outwardly; venation pale brown. Head black, the antennae red except distal two-thirds of the club. Umbilicately punctate and with sparse white pubescence. Abdominal petiole with longitudinal carinae far apart. Fore wings practically naked, without marginal cilia. First funicle joint longest, the others more or less subquadrate, the club long, conical.

(From one specimen, 2-3-inch objective, 1-inch optic, Bausch and Lomb.)

Male.—Not known.

Described from one female captured as above.

Habitat: Australia—Capeville (Pentland), Queensland.

Type: In the Queensland Museum, Brisbane, the above specimen on a tag plus a slide bearing the head and posterior femur.

A new Borborid (Diptera) from Panama.

By J. R. Malloch, Urbana, Illinois.

Sphaerocera pallipes, new species.

Female.—Black, slightly shining. Antennæ yellow, basal joint darkest; proboscis yellow. Thorax black, pleurae shining. Abdomen black on dorsum, yellow beneath. Legs entirely pale yellow. Wings clear, veins yellow. Halteres yellow.

Frons opaque, slightly granulose on surface, rather more than one-half as wide as head, no bristles present, the surface hairs pale and very short; antennæ small, inserted in cavities on either side of the upper part of the face, which is flattened, triangular in shape and projects distinctly beyond the anterior margin of frons; the antennæ thus lie at right angles to the long axis of the body; arista hair-like, bare, and about twice as long as width of frons; mouth opening large; labrum flattened, distinctly protruding; cheek as high as the rather small eye; in profile the head is flattened in front and almost upright; the eye occupies slightly more than one-half the distance from vertex to anterior margin of head. Thorax in poor condition, but mesonotum with evident traces of four longitudinal rows of short, pale hairs on disk; scutellum rounded in outline, the posterior margin with faint traces of tubercules, one at either side, widely separated, being most distinct. Abdomen elongate oval; segments bare above. Legs long, and strong; their surfaces with very short, pale hairs, but no bristles present; hind tibia without an apical spur; hind metatarsus swollen, the upper surface slightly rounded; ventral surface flattened, the usual brush of hairs of the other species in the genus is represented only by a few hairs which are most distinct at apex; length of metatarsus about one and one-fourth that of the second joint which is not swollen; claws long, black at apices. Wings with veins 3 and 4 distinctly convergent at apices.

Length, 1.5 mm.

Type: Cat. No. 15974, U. S. N. M.

Locality: Buena Ventura, Panama, May 19, 1911, (A. Busck).

Distinguished from *S. subsultans* Fabricius by the absence of the spur on hind tibia, from *S. bimaculata* Williston by the unicolorous abdomen, from *S. pusilla* Fallon by the course of the third and fourth veins, and from *S. annulicornis* Malloch by the entirely pale legs.

The Twentieth Australian Species of Elasmus (Hym., Chalcidoidea).

By A. A. GIRAULT, Nelson (Cairns), N. Q., Australia.

The following species was captured in North Queensland with the sweeping net.

Elasmus doddi new species.

Female.—Length, 2 mm.

In my table of species of the genus (Memoirs Queensland Museum, Brisbane, I, 1912, pp. 188-189), running to *formosus* Girault but differing in having the scutellum wholly black (except narrowly at middle of the side), the vertex wholly yellow, the tip of postscutellum black. Head and scutum with thimble punctures, the scutellum scaly. Legs pallid yellow, the posterior coxae narrowly black at upper edge, the antennae dusky yellow, with two ring joints. Pronotum very narrowly black along cephalic margin, the dorsal half of occiput black.

(From one specimen, 2-3-inch objective, 1-inch optic, Bausch & Lomb.)

Male.—Not known.

From one female captured at Nelson (Cairns), North Queensland, April 1, 1913, by Mr. Alan P. Dodd for whom the species is named as a recognition of his early promise.

Habitat: Australia—Nelson, Queensland.

Type: In the Queensland Museum, Brisbane, the above specimen on a tag.

A new Wasp from Colorado (Hym.).

By T. D. A. COCKERELL, University of Colorado.

On June 26, 1913, when collecting bees at Longs Peak Inn, Colorado, in the Canadian Zone, I captured a wasp which I could not at first determine generically. On close investigation, it proves to belong to *Dryudella* Spinola, based on a species of Southern Europe. According to Kohl, *Dryudella* is a subgenus of *Astata*, but the venation is so peculiar that I think it may well rank as a genus. My species is new, and I take pleasure in naming it after Mr. Enos Mills, the well known writer on the natural history of Colorado, resident at Longs Peak Inn.

Dryudella millsi n. sp.

♀—Length, about 7 mm.; head, thorax, legs and antennæ black, the anterior tibiæ dark reddish brown on inner side except apically; pubescence very scanty, pale, black in region of mouth; abdomen with the first two segments (except base of first), and sides of third basally to some extent, bright ferruginous; the rest of abdomen black; head

shining, broader than thorax; lower margin of middle lobe of clypeus broadly rounded, rather prominent, but not specially modified; front and vertex very sparsely punctured; third antennal joint longer than fourth, fifth about as long as fourth; mesothorax and scutellum highly polished, with a few scattered punctures; area of metathorax dull and granular, with a slight oblique striation; sides of metathorax striate; tegulæ black; anterior wings dusky hyaline, not very dark, nervures and stigma piceous; venation of anterior wings much as in *Dryudella tricolor* (*Astata tricolor* v. d. Linden), but differing as follows: Marginal cell longer (but not nearly equal to stigma on costa), first recurrent nervure joining second submarginal cell a very short distance from the base, basal nervure not falling so far short of transverso-medial; middle and hind tibiæ with numerous black spines; abdomen smooth and shining; basal part of pygidial area microscopically reticulate.

In Fox's table (Proc. Acad. Nat. Sci. Phila., 1893, p. 540) of *Astata* this runs to 8, and runs out on account of the black tegulae and structure of clypeus. *Dryudella caerulea* (*Astata caerulea* Cresson) is another species of this genus. I have taken it upon the campus of the University of Colorado at Boulder, September 9. I was at one time inclined to regard it as a new genus or subgenus, but Mr. S. A. Rohwer expressed the opinion that it was a *Dryudella*, and upon further study I must agree with him. It is atypical however in the shape of the third submarginal cell, and in having the first recurrent nervure joining the second submarginal cell far from the base. The metallic blue color is also remarkable.

An Aberration of Pyrameis huntera (Lep.).

On Sept. 12th, 1913, I captured a curious aberration of *Pyrameis huntera* near the Canadian Pacific Railway works here. The specimen is a large one and a female. The black markings have run together and become blurred and the white spots on the upper side are exaggerated. Also there is a purplish suffusion at the apex of each upper wing. The ground color of the upper side of the lower wings is darker than in the type apparently due to the fact that the dark basal cloud of the type has spread all over the wing.

On the underside the same tendency towards the blurring of the black markings is apparent, but on the pink area of the upper wings the black is replaced by indistinct orange marks. The lower wings are very dark underneath and much of the white penciling of the basal portion in the type is suppressed in this specimen.

I should be grateful if some one interested in this capture would let me know if there is any particular name for this aberration.—H. M. Simms, 192 Ontario East, Montreal, Canada.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

TO CONTRIBUTORS.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, four weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form and without covers, will be given free, when they are wanted; if more than twenty-five copies are desired, this should be stated on the MS. The receipt of all papers will be acknowledged. Proof will be sent to authors for correction only when specially requested.—Ed.

PHILADELPHIA, PA., JANUARY, 1914.

Alfred Russel Wallace.

The opening sentence of the NEWS for July, 1913: "In the death of Lord Avebury, on May 28, there passed away the youngest, but not the last, of that group of famous English naturalists intimately associated with Darwin and the promulgation of his theories," is no longer true. Alfred Russel Wallace, "the last," died on November 7, 1913, aged 90 years and ten months less one day. The length of his life is remarkable, considering the attacks of disease from which he suffered both in England and on his expeditions to the Amazon and the Malay Archipelago.

His autobiography, published in two volumes in 1905, under the title, *My Life A Record of Events and Opinions, with facsimile letters, illustrations and portraits,* renders unnecessary any account of his life in this place. It is not superfluous, however, to recall his entomological labors and the influence which he considered that the study of insects had upon his own career and that of his co-discoverer of the theory of natural selection.

At the meeting held by the Linnean Society of London on July 1st, 1908, to celebrate the Fiftieth Anniversary of the joint communication made by Charles Darwin and Alfred Russel

Wallace to the Society, "On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection," the first Darwin-Wallace medal was presented to Wallace, who said in reply, among other things:

this brings me to the very interesting question: Why did so many of the greatest intellects fail, while Darwin and myself hit upon the solution of this problem—a solution which this Celebration proves to have been (and still to be) a satisfying one to a large number of those best able to form a judgment on its merits? As I have found what seems to me a good and precise answer to this question, and one which is of some psychological interest, I will, with your permission, briefly state what it is.

On a careful consideration, we find a curious series of correspondences, both in mind and in environment, which led Darwin and myself, alone among our contemporaries, to reach identically the same theory.

First (and most important, as I believe), in early life both Darwin and myself became ardent beetle hunters. Now there is certainly no group of organisms that so impresses the collector by the almost infinite number of its specific forms, the endless modifications of structure, shape, color and surface-markings that distinguish them from each other, and their innumerable adaptations to diverse environments. * * *

Again, both Darwin and myself had what he terms "the mere passion of collecting"—not that of studying the minutiae of structure, either internal or external. I should describe it rather as an intense interest in the mere *variety* of living things—the variety that catches the eye of the observer even among those which are very much alike, but which are soon found to differ in several distinct characters. * * *

It is the constant search for and detection of these often unexpected differences between very similar creatures that gives such an intellectual charm and fascination to the mere collection of these insects; and when, as in the case of Darwin and myself, the collectors were of a speculative turn of mind, they were constantly led to think upon the "why" and the "how" of all this wonderful variety in nature—this overwhelming, and, at first sight, purposeless wealth of specific forms among the very humblest forms of life.

Then, a little later (and with both of us almost accidentally) we became travelers, collectors and observers, in some of the richest and most interesting portions of the earth; and we thus had forced upon our attention all the strange phenomena of local and geographical distribution, with the numerous problems to which they give rise. Thenceforward our interest in the great mystery of *how* species came into ex-

istence was intensified, and—again to use Darwin's expression—"haunted" us.

Finally, both Darwin and myself, at the critical period when our minds were freshly stored with a considerable body of personal observation and reflection bearing upon the problem to be solved, had our attention directed to the system of *positive checks* as expounded by Malthus in his "Principles of Population." The effect of this was analogous to that of friction upon the specially-prepared match, producing that flash of insight which led us immediately to the simple but universal law of the "survival of the fittest," as the long sought *effective* cause of the continuous modification and adaptation of living things.

Wallace's interest in beetles, as he tells in *My Life* (i, pp. 236-237), was due to his meeting Henry Walter Bates, in 1844 or 1845, as a result of which he not only began to collect these insects but also to enter into a correspondence with Bates that eventually led to their joint visit to the Amazon. Their choice of this region of the world was the result of reading W. H. Edwards' *A Voyage up the Amazon,* published in 1847. Edwards, being in London soon after, gave the young Englishmen letters of introduction to friends at Para. Forty years later, in April, 1887, Wallace renewed his personal acquaintance with the great American lepidopterist by a visit to the latter's home at Coalburgh, West Virginia.

The richest parts of Wallace's South American collections, 1848-1852, were lost by the burning of the vessel on which he was returning to England. He mentions, in his *Narrative of Travels on the Amazon and Rio Negro,* having gathered 900 species of diurnal Lepidoptera.

He was more successful in his journey to the East, 1854-1862, and, in the preface to *The Malay Archipelago,* tells us that when he returned to England in the spring of 1862 he found that the collections which he had retained for his private use included "at least twenty thousand beetles and butterflies, of about seven thousand species," while the total numbers of specimens which he secured were 13100 specimens of Lepidoptera, 83200 Coleoptera and 13400 other insects. His papers, *The Malayan Papilionidae, as illustrating the Theory of Natural Selection* (Trans. Linn. Soc. Lond. xxv),

on the Pieridae of the Indian and Australian regions and on the Cetoniidae of the Malay Archipelago (these two in Trans. Ent. Soc. Lond. 1867) were based in large part on his own collections, are summarized in *My Life* (i, pp. 400-403) and constitute his systematic entomological work.

Many of his essays on general subjects such as Mimicry, and many chapters in his larger works, *The Geographical Distribution of Animals, Darwinism, Tropical Nature,* etc., are founded on his own observations on insects. As President of the Entomological Society of London, his address in January, 1871, dealt with the peculiarities of insular insects, while that of 1872 "endeavoured to expound Herbert Spencer's theory of the origin of insects, on the view that they are fundamentally *compound animals,* each segment representing one of the original independent organisms."

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

The Alligator Pear Weevil (Col.)—A Correction.

On page 416, ENTOMOLOGICAL NEWS, vol. XXIV, No. 9, November, 1913, under "Notice of Public Hearing on the Alligator Pear Weevil," the insular possessions Hawaii and Porto Rico are incorrectly cited as localities in which the avocado weevil (*Heilipus lauri* Boh.) is known to occur. The only other records of this weevil known to us other than Mexican are Central American. Naturally, no quarantine action will be taken or is intended against the islands referred to, or other avocado-producing countries free from this weevil. The error in the notice is sincerely regretted, and was due to the absence from Washington of the writer at the time.—C. L. MARLATT, Chairman, Federal Horticultural Board, Washington, D. C.

Acknowledgment of Photographs Received.

The album of the Entomological Section of the Academy of Natural Sciences of Philadelphia has been increased by the addition of the photographs of the following persons, and the thanks of the Section are tendered to the donors for their gifts:

Messrs. R. Godfrey,* Harry L. Johnson, A. L. Melander, D. E. Merrill, F. W. Nunenmacher, J. H. Reading, R. J. Smith and O. S. Westcott.

* Deceased since receipt of the photograph.

"Daddy-long-legs"?

It is evident that the newspapers of other countries are no more seekers after truth than those of our own, especially regarding scientific facts. In the Entomological Record for October 15, 1913, under the heading "Newspaper Entomology" one reads of a notice of an article relative to daddy-long-legs published in a London newspaper. It is utterly useless to question the truth or the validity of the facts as given in such newspaper articles, unless written by a competent scientist, as doing so only holds one up to ridicule by the ignoramuses; for it is seldom that a newspaper acknowledges its mistakes or misinformation, or offers any but childish excuses for publishing such articles.

Regarding the article in question, it may be noted that to an American, or, at least, to some of us in the eastern part of the United States, "Daddy-long-legs" refers to "harvest spiders" or "harvestmen," members of the Arachnid order Phalangida. At first glance one might think the author of the article referred to these animals, but in England the name "Daddy-long-legs" is given to some of the members of the dipterous family Tipulidae which of course have "six pairs of legs (evidently meaning six legs), long body and wings." The assertion that "at one time he was classed as an insect, but Lamarck separated him from them, and now he is catalogued along with scorpions and mites" is obviously rubbish, manufactured out of the whole cloth of ignorance.

Incidently it may be noted that species of Tipulidae are known to be very injurious to pasture lands in the western United States.—E. T. C., Jr.

Schinia gloriosa Strecker (Lepidop.).

During the past summer I obtained a fine specimen of the beautiful *Schinia gloriosa* in Boulder, Colorado. The species was described from Texas, and appears to be new to Colorado. The species is larger than *S. sanguinea,* with much paler hind wings; the figure purporting to represent it in Holland's Moth Book, pl. XXVII, f. 27, is evidently *sanguinea.* Hampson (Cat. Lep. Phal., IV, p. 89) did not know *gloriosa,* and his table is not satisfactory for its separation. It might be amended as follows:

Fore wings with terminal area without longitudinal white or whitish streaks; hind wings pale . . . . . *regia* Strecker.

Fore wings with terminal area conspicuously longitudinally streaked with white or whitish.

Larger; hind wings creamy white, darkened at apex *gloriosa* Strecker.

Smaller; hind wings fuscous . . . . *sanguinea* (Geyer).

—T. D. A. Cockerell.

Parasites of the San Jose Scale (Hym.).

In connection with the editorial in the NEWS for November, 1913, it may be of interest to state that the parasite reported as doing such effective work against the San Jose Scale in Pennsylvania was discovered at Amherst, Mass., in the fall of 1912 in great abundance. It was carefully studied, and as it could not be identified, specimens were sent to Dr. L. O. Howard, who declared it to be a new species of *Prospaltella.*

A description of the insect was published under the name of *Prospaltella perniciosi* in the Annals of the Entomological Society of America, Vol. VI, No. 1, by Mr. D. G. Tower, and studies were continued upon it in the summer of 1913. During the present fall, colonies of this insect have been sent to Washington and Georgia, in the hope of establishing it there, and shipments to other places will be made as opportunity offers. From 75 to 85 per cent. of the scales appear to be parasitized in nature, and as large a per cent. occurs on the small twigs as on the larger ones.

A shipment of the Pennsylvania parasite just received from Professor Surface has made direct comparison of the two possible, and there can be no doubt that they are the same species. In the Pennsylvania consignment *Aphelinus fuscipennis* and *Prospaltella perniciosi* were found, the latter including perhaps three-fourths of the specimens. A letter just received by Mr. Tower from Dr. Howard states: "Professor Surface came to Washington a month or more ago with a series of slides of material reared from San-Jose-scale-infested twigs, and among these parasites I found *Aphelinus fuscipennis* How., a Mymarid, * * * *Anagrus spiritus* Girault, *Signophora nigrita* Ashm. and your *Prospaltella perniciosi.*" From the evidence we have it would seem probable that the *Prospaltella* is the one which is doing most of the work.

If claims of priority are in order, it would seem that the date of publication of Mr. Tower's description (March, 1913) should be considered, while the files of the Bureau of Entomology at Washington will provide evidence that the insect was discovered and studied several months before that time.

Careful examination of twigs from Pennsylvania and also from Massachusetts indicates that despite a large amount of parasitism we need hardly expect the scale to soon become an unimportant pest as long as any such number as 10 per cent. are left "for seed."—H. T. FERNALD, Massachusetts Agricultural College, Amherst, Mass.

The species figured in all the newspapers and the one Professors Surface and Grim had the controversy over is a Mymarid, described under the name of *Anagrus spiritus* Girault, in ENT. NEWS, XXII, p. 209, 1911. Prof. Grim sent us the slide that Prof. Surface had and it was sent to Mr. Malloch to compare with the type at Urbana, Illinois. Mr. Malloch reports them identical.—H. S.

Human Case of Verruga directly traceable to Phlebotomus verrucarum (Dipt.).

Mr. George E. Nicholson, who has been my assistant in the verruga work since the last of July, and who has rendered particularly efficient service in the investigation at all times, notwithstanding numerous difficulties to be continually overcome, has most unfortunately developed unmistakable symptoms of the disease. A brief outline of the case is as follows:

On the 17th of September, accompanied by both Mr. Nicholson and Mr. Rust, I went to Verrugas Canyon to secure material of the Phlebotomus for inoculation of laboratory animals. Both Mr. Nicholson and myself have passed numerous nights there on the same work, and Mr. Rust has been there twice. As usual we applied the ointment recommended by Newstead and were not molested by the Phlebotomus up to the time of retiring at about midnight. We all used tight nets for sleeping, through which the Phlebotomus could not pass. During the night, however, while asleep, Mr. Nicholson evidently put his hands above his head so that they came in contact with the net, for in the morning we counted fifty-five unmistakable Phlebotomus bites on the backs of his hands and wrists. These bites are small, irregular in outline, red, and not raised, as Mr. Rust and I know from a half dozen that we received on July 9th while awake and before we had begun to use the ointment. We also know that during all our night collecting at Verrugas Canyon from July to September, no other biting insect except the Phlebotomus appeared, not even a single culicid, and on one occasion I sat up the entire night.

Daily examination of Mr. Nicholson's blood revealed nothing abnormal until October 1, when I found what I considered to be the verruga x-bodies in the red cells, but Dr. A. L. Barton, the best known authority on verruga, pronounced them not so. This was due to the smear having been somewhat overstained as compared with Dr. Barton's customary practice in staining. These x-bodies continued in very small number without clinical symptoms of note, other than a headache or slight feverishness at times, until October 25th, when a decided rise of temperature occurred and the x-bodies were found to be much increased in number. Dr. Barton now recognizes these to be the verruga x-bodies, and Mr. Nicholson has entered the Guadalupe Hospital in Callao under Dr. Barton's immediate care. During the past week his temperature has been lower than at first, and the case promises to be of the benign type rather than the malignant. No eruption has appeared as yet. Salvarsan was administered intravenously to-day, for the purpose of determining whether it will prove a specific against the disease.—CHARLES H. T. TOWNSEND.

Chosica, Peru, November 10th, 1913.

Notice to Authors.

Authors publishing entomological articles in non-entomological journals, who desire to have such articles noted in our current literature list, will do well to send copies of them to ENTOMOLOGICAL NEWS, 1900 Race St., Philadelphia, Pa. After note has been made of the same, they will be deposited in the library of the American Entomological Society.

Entomological Literature.

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded. The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published, and are all dated the current year unless otherwise noted, always excepting those appearing in the January and February issues of the News, which are generally dated the year previous.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of systematic papers are all grouped at the end of each Order of which they treat, and are separated from the rest by a dash.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington.

4—The Canadian Entomologist. **5**—Psyche. **7**—U. S. Department of Agriculture, Bureau of Entomology, Washington. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **12**—Comptes Rendus, L'Academie des Sciences, Paris. **21**—The Entomologist's Record, London. **22**—Zoologischer Anzeiger, Leipzig. **24**—Berliner Entomologische Zeitschrift. **36**—Transactions, Entomological Society of London. **46**—Tijdschrift voor Entomologie. **50**—Proceedings of the U. S. National Museum. **65**—La Feuille des Jeunes Naturalistes, Paris. **68**—Science, New York. **73**—Archives, Zoologie Experimentale et Generale, Paris. **79**—La Nature, Paris. **97**—Zeitschrift fur wissenschaftliche Zoologie, Leipzig. **102**—Proceedings of the Entomological Society of Washington. **119**—Archiv fur Naturgeschichte, Berlin. **136**—Stettiner Entomologische Zeitung. **166**—Internationale Entomologische Zeitschrift, Guben. **179**—Journal of Economic Entomology. **180**—Annals, Entomological Society of America. **189**—Journal of Entomology and Zoology, Claremont, Calif. **190**—Deutsche Entomologische Zeitschrift "Iris," Dresden. **194**—Genera Insectorum. Diriges par P. Wytsman, Bruxelles. **198**—Biological Bulletin, Marine Biological Laboratory, Woods Hole, Mass. **204**—New York State Museum, Albany. **216**—Entomologische Zeitschrift, Frankfurt a. M. **275**—Philippine Journal of Science, Manila.

276—Bulletin, Societe Lepidopterologique de Geneve. **299**—Mitteilungen der Naturhistorischen Gesellschaft zu Hanover. **313**—Bulletin of Entomological Research, London. **344**—U. S. Department of Agriculture, Washington, D. C. **368**—The Monthly Bulletin of the State Commission of Horticulture, Sacramento, Cal. **369**—Entomologische Mitteilungen, Berlin-Dahlem. **407**—Journal of Genetics, Cambridge, England. **420**—Insecutor Inscitiae Menstruus: A monthly journal of entomology, Washington, D. C. **447**—Journal of Agricultural Research, Washington. **451**—Nature Study Review, Ithaca, N. Y. **452**—Lepidopterorum Catalogus, editus a H. Wagner. **453**—Texas Agricultural Experiment Station. **454**—North Carolina Department of Agriculture, Raleigh. **458**—Montana Agricultural College Experiment Station, Bozeman.

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ÉTUDES LEPIDOPTÉROLOGIE COMPARÉE. By CHARLES OBERTHUR. Volume IX, Part 1.

This part contains an exceedingly important contribution to American Lepidopterology, as herein Mr. Oberthür gives 74 figures in color, of the species of Californian butterflies, described by Dr. Boisduval in the Annals of the Entomological Society of France in 1852 and in the Annals of the Entomological Society of Belgium in 1869. Dr. Boisduval's descriptions were often brief and he compared the Californian species with those of Europe in a very few words. It has been quite difficult, on account of the variation in the species of Californian Lycaenidae and Hesperidae, to be certain about some of Dr. Boisduval's species in reference to those described by Dr. Herman Behr, William H. Edwards, Henry Edwards and others. By means of these beautiful and accurate figures given by Mr. Oberthür it will be possible to put the study of the Californian diurnal Lepidoptera on a firm foundation. American students of these insects owe a great debt of gratitude to Mr. Oberthür for so generously supplying figures of these types and recognizing the necessities of the case.

It may prove useful at this time to make some comments on the species in relation to their validity or synonymy.

Thecla borus Bd. is a synonym of *californica* Edw.

Thecla auretorum Bd. *Thecla spadix* H. Edw. is a synonym of this.

Thecla sylvinus Bd. This species I do not know, unless it is a race or variety of *californica* Edw.

T. iroides Bd. is a synonym of *augustus* Kirby.

Thecla eryphon Bd. is a western race of *niphon* Hübn.

Thecla dumetorum is a synonym of *rubi* Linn.

Chrysophanus arota Bd. The species described as *virginiensis* by Edwards is close but apparently sufficiently distinct for specific rank.

Chrysophanus xanthoides Bd. *Dione* Scud. is close to this.

Chrysophanus nivalis Bd. This has erroneously been put into the synonymy in our lists under *mariposa*.

Chrysophanus zeroe Bd. is a synonym of *mariposa* Reak.

Lycaena suasa Bd. is a synonym of *fuliginosa* Edw.

Lycaena antiacis Bd. This must be a rare form. *Polyphemus* Bd. is the common species in California.

L. rhaea Bd. is a synonym of *sagitiggera* Feld.

L. nestos Bd. is a synonym of *podarce* Felder.

L. nivium Bd. is a synonym of *shasta* Edw.

L. antaegon Bd. is a synonym of *acmon* Dbl.-Hew.

L. philemon Bd. is a synonym of *anna* Edw.

L. regia Bd. is a synonym of *sonorensis* Feld.

Pamphila comma Bd. This is close to the variety *juba* Scud.

Pamphila agricola. *Siris* Edw. is a synonym.

Pamphila pratincola. This is not typical of the species and probably represents an aberration or variety.

P. campestris Bd. The eastern *huron* Edw. is the same species.

Pamphila sylvanoides Bd. *Napa* Edw. is a synonym.

Pamphila nemorum Bd. *Verus* Edw. is a synonym.

P. vestris Bd. *Metacomet* Harris is a synonym.

Thanaos tristis Bd. *Funeralis* Scud.-Burg. is probably not a synonym.

These figures will enable us to make further studies of interest. The available time at present has been too short to study them all carefully and they will be taken up as the species in the various genera are studied more minutely.—HENRY SKINNER.

OBITUARY.

JULES DESBROCHERS DES LOGES, French Coleopterist, editor of *Le Frelon* (Chateauroux), died on August 10, 1913, at Tours in his 78th year.

The numbers of *The Entomologist's Monthly Magazine* and *The Entomologist* for October, 1913, contain obituary notices (the former accompanied by a portrait) of ODO MORANNAL REUTER, the distinguished Finnish entomologist, and, since 1906, one of the twelve honorary fellows of the Entomological Society of London. He died at Abo, on September 2, aged 63. Like our own Uhler, he was totally blind in his later years. No less than 500 papers on Hemiptera (chiefly), Collembola, Thysanoptera and Neuroptera have issued from his pen. His work on the Miridae (Capsidae) and a new classification of the Heteroptera are especially important. He was a member of the zoological faculty of the University of Helsingfors. He had also published both poetry and fiction.

ENTOMOLOGICAL NEWS for December, 1913, was mailed at the Philadelphia Post Office on December 4, 1913.

EXCHANGES.

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☞ These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued

Graphiphora garmani, *Heliomata infulata*, *Plagodis keutzingi* and many other species of Lepidoptera (Heterocera) from this locality offered for exchange.—Fred Marloff, Box 104, Oak Station P. O., Allegheny Co., Penna.

Wanted—For cash, fertile eggs, blown larvae and imagines of *Catocalae* of the U. S. Fertile eggs of *C. badia* and *C. muliercula* in particular.—Geo. J. Keller, 191 Avon Ave., Newark, N. J.

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Cicindela modesta in exchange for N. A. Coleoptera. Send list of not more than twenty species that you have to offer.—Philip Laurent, 31 East Mt. Airy Ave., Phila., Pa.

Wanted—Psyche, Nos. 265, 267, 268, Vol 8, and 297, 298, 300, Vol. 9, or will buy Vols. 8 and 9 complete; also want complete set of American Entomologist.—Librarian, Stanford University, California.

Will name and return Beetles of certain families. Correspondence with beginners and inexperienced collectors desired.—C. A. Frost, 26 Pond St., So. Framingham, Mass.

Wanted—Pupae of *Papilio ajax* and *rutulus*.—Ward's Natural Science Establishment, 84 College Ave., Rochester, N. Y.

Hemiptera—California Homoptera and Heteroptera, including all families, exchanged for specimens from all parts of the globe, but especially from North America.—E. O. Essig, Secretary, State Commission of Horticulture, Sacramento, California.

Mordellidae (Coleoptera) wanted from all parts of the world for cash or exchange. Also desire to exchange North American Coleoptera.—Alan S. Nicolay, 416a Girard Ave., Brooklyn, N. Y.

Wanted—North American specimens of the following European Heteroptera: *Dasycoris pilicornis* Burm.; *Gastrodes ferrugineus* Linne; *Gonianotus marginepunctatus* Wolff; *Microtoma atrata* Goeze; also the following: *Orsillus scolopax* Say: *Acantholoma denticulata* Stal; *Agrammodes costatus* Uhl. and *Galeatus peckhami* Ashm.—J. R. de la Torre Bueno, 14 Dusenbury Place, White Plains, New York.

Hydroporus and Deronectes—Species of these and allied genera wanted from all parts of the world, either by purchase or exchange. Specimens must be perfect, but not necessarily named.—John D. Sherman, Jr., 403 Seneca Ave., Mount Vernon, N. Y.

Lepidoptera—Prime specimens of butterflies from this section (either spread or papered) in exchange for other North American species new to my collection.—R. A. Leussler, 1137 So. 31st St., Omaha, Neb.

Photographs of Entomologists Desired.

The Entomological Section of the Philadelphia Academy of Natural Sciences desires for its entomological album the photograph of every entomological student. The collection contains over 300 at this date. A list was published in the NEWS 1902, pages 45-47, of those in the album at that time. We hope that those who can do so will write their names and date of birth and the date when the photograph was taken on the back of each photo, along with any other information concerning themselves they may wish to impart.

☞ *N. B.* The original manuscripts and illustrations of the articles which appeared in the NEWS for 1911 and 1912, together with the galley proofs of the same, **will be destroyed on February 1, 1914.** Anyone wishing them will apply to the Editor, Dr. P. P. Calvert, 4515 Regent St., Philadelphia, Pa., before that date and must enclose postage.

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